R E P O R T R E S U M E S

ED 011 874 SP 000 987

COGNITIVE OBJECTIVES REVEALED BY CLASSROOM QUESTIONS ASKED BY SOCIAL STUDIES STUDENT TEACHERS.

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PUB DATE FEB 67

EDRS PRICE MF-$0.09 HC-$0.36 9P.

DESCRIPTORS- BIBLIOGRAPHIES, *COGNITIVE PROCESSES, COMPREHENSION, *LESSON OBSERVATION CRITERIA, *QUESTIONING TECHNIQUES, RETENTION, SECONDARY EDUCATION, *SOCIAL STUDIES, STUDENT TEACHERS, *STUDENT TEACHER RELATIONSHIP, TABLES (DATA), NEW YORK CITY, TEACHER PUPIL QUESTION INVENTORY (TPQI)

TO DETERMINE THE RANGE OF COGNITIVE OBJECTIVES IMPLICIT IN THE QUESTIONS ASKED BY STUDENT TEACHERS AND THEIR PUPILS IN HIGH SCHOOL SOCIAL STUDIES CLASSES, 44 CLASSES WERE OBSERVED ACCORDING TO THE TEACHER PUPIL QUESTION INVENTORY (TPQI) DEVELOPED BY THE INVESTIGATORS. THE TPQI REQUIRES A 30-MINUTE CLASSROOM OBSERVATION DIVIDED INTO ALTERNATING 5-MINUTE PERIODS. EACH QUESTION ASKED BY THE TEACHER OR PUPIL IS CLASSIFIED INTO ONE OF NINE CATEGORIES--MEMORY, INTERPRETATION, TRANSLATION (OR TRANSFORMATION), APPLICATION, ANALYSIS, SYNTHESIS, EVALUATION, AFFECTIVITY, AND PROCEDURE. THE RESULTS SHOWED THAT BOTH TEACHERS AND PUPILS ASKED MORE "MEMORY" QUESTIONS THAN ALL OTHERS COMBINED. NEXT IN FREQUENCY WERE "INTERPRETATION" AND "TRANSLATION" QUESTIONS. THESE TWO CATEGORIES CAN BE COMBINED INTO ONE, "COMPREHENSION," DESCRIBED BY BLOOM (1965) AS THE LOWEST FORM OF INTELLECTUAL ACIVITY. THEREFORE, THE INTELLECTUAL ATMOSPHERE OF THESE CLASSES CAN BEST BE CHARACTERIZED AS MEAGER. TO REMEDY THIS SITUATION, THE AUTHORS PROPOSE THAT (1) MORE ATTENTION BE GIVEN TO DIFFERENT COGNITIVE OBJECTIVES IN SOCIAL STUDIES CLASSROOMS AND (2) INCREASED, SPECIFIC UNDERSTANDING OF QUESTIONING AND ITS PURPOSES AND IMPROVED QUESTIONING SKILLS BE INCLUDED IN TEACHER EDUCATION PROGRAMS. THIS PAPER WAS PRESENTED AT THE ANNUAL MEETING OF THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION (NEW YORK, FEBRUARY 1967). (LC)

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COGNITIVE OBJECTIVES REVEALED BY CLASSROOM QUESTIONS ASKED BY SOCIAL STUDIES STUDENT TEACHERS[1, 2]

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Questions posed in the social studies classroom for over half a century have been recognized as emphasizing memory as the most important cognitive operation (e.g., Adams, 1964; Barr, 1929; Stevens, 1912). Yet, during this period, the attention of the social studies has been focused repeatedly on admonitions to foster pupils' critical thinking and, especially in recent years, discovery procedures. Common also has been the belief that classroom questions of "fact" and "thought" productively might be distinguished. Consequently, more appropriate social studies objectives have been thought possible by teachers stressing "thought" questions.

In the past decade considerable progress has been made in the analysis of cognitive operations (Bloom, 1956; Guilford, 1956) and "memory" and "knowledge" have come to be seen more adequately as essential and prerequisite to thinking. Cognitive processes, misunderstood as "thought" in general, have been identified in hierchical complexity. Use of these systems as criteria has proved powerful in understanding a variety of educational matters. With respect to instructional objectives, the Taxonomy of Educational Objectives: Cognitive Domain (Bloom, 1956) has been particularly influential. For example, objectives revealed in social studies textbook questions have been analyzed (Davis and Hunkins, 1966) as have classroom examinations (Pfeiffer and Davis, 1965) and Javolinek (1962) has demonstrated the Taxonomy's value in planning differentiated instruction.

The Taxonomy, however, has not been applied to an analysis of questions in classroom interaction. Previous studies of teaching have considered questions in their analyses e.g., Bellack and Davitz, . Some of these studies have highlighted thinking processes fostered in the classrooms (e.g., Aschner and Gallagher, 1963; Smith and Meux, 1962; Taba, Levine, and Elzey, 1964), but only recently have rather productive analytic schemes been modified to incorporate attention to cognitive dimension of teachers' questions (Amidon, 1966; Medley, 1966). Classroom questioning has provided the substance for focused inquiries into teaching (e.g., Dodl, 1966; Sloan and Pate, 1966), but the questions of both teachers and pupils have not been studied against the criteria of the Taxonomy.

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[1]This paper was presented at the annual meeting of the American Educational Research Association, New York, February, 1967.

[2]The authors gratefully acknowledge the cooperation of Don Edwards, Jean McMillan, and Gregg Millett for their assistance in data collection and to Luke Davis, III and Cathy Hennan for help in data processing.

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This study, then, was designed to determine the range of cognitive objectives manifest in secondary school social studies classrooms by questions asked by student teachers and their pupils.

Method

Participating in the study were 44 individuals enrolled in secondary student teaching of the social studies at The University of Texas during the fall semester, 1966. Of these, 32 taught at the senior high school leve and 12 taught in junior high schools.

A Teacher-Pupil Question Inventory (TPQI) was developed by the investigators and was the source of data analyzed in this study. The TPQI schedule requires a classroom observation of 30 minutes divided into alternating five-minute periods. At each instance of a question asked by either the teacher or a pupil, the observer decides which category in which the question may be classified and marks a tally in a provided space. Questions are judged by attention to their form and inferred intent as well as the nature of the response elicited and its reception by the pupil or teacher. The TPQI has nine categories, seven of which are based on the Bloom Taxonomy and the formulations of Sanders (1966). The remaining two classifications include non-cognitive questions. The nine categories are as follows:

1. Memory--The one questioned recalls or recognizes information (facts, generalizations, etc.);
2. Interpretation--The one questioned states relationships between various types of data;
3. Translation--The one questioned changes information into a different form (linguistic, symbolic, image, etc.);
4. Application--The one questioned solves a realistic problem requiring the identification of the crucial issue or points and the selection and use of appropriate knowledge and skills;
5. Synthesis--The one questioned suggests answers to a problem that is original, speculative, or creative;
6. Evaluation--The one questioned makes a judgment according to explicit criteria (external or internal);
7. Affectivity--The one questioned responds with a statement of feeling, emotion, or opinion without a standard of appraisal;
8. Procedure--The question relates to classroom orgniazation, student behavior, or instructional management.

All S's were observed at least twice by their regular university supervisor. Prior to the observations and following a design similar to one used by Flanders (1963), the supervisors underwent a period of training in the use of the TPQI and procedures to be followed in the study. By the end of training, the observers reached almost unanimous agreement on classification of questions in the training (audio-taped) materials. Midway during the observation period, observers met again for another training session. Consequently the reliability of observations may be considered adequate.

Results

TPQI item frequencies were determined for the entire group; means of individual teachers' item totals were computed and medians of these means were determined (see Table I).

Table I

Total Questions and Medians and Ranges of Mean Number of Questions Asked by Social Studies Student Teachers and Their Classes (N=44)

Question Category	TEACHERS Total	TEACHERS Median	TEACHERS Range	PUPILS Total	PUPILS Median	PUPILS Range
Memory	1313	11.25	.67-36.33	714	0.25	0-5.00
Transformation	187	1.00	0-8.00	123	0	0-4.00
Interpretation	391	3.70	0-10.00	401	0.33	0-4.33
Application	40	0	0-5.00	0	0	0
Analysis	66	0	0-6.00	3	0	0-.50
Synthesis	10	0	0-4.00	5	0	0-2.00
Evaluation	136	.70	0-11.00	15	0	0-1.50
Affectivity	78	0	0-8.00	4	0	0-.50
Procedural	299	2.50	0-11.0	118	0	0-6.00

Inspection of these data reveals that both teachers and pupils asked more "memory" questions than all other questions combined. The next largest number of questions fell in the "interpretation" and "transformation" categories. "Procedural" questions for both teachers and pupils and "evaluation" questions for teachers followed as less frequently asked. The medians of zero (0), as well as the low item frequencies, indicated that questions asking for expressions of "affectivity" and the higher cognitive processes were seldom noted overall and, when observed, were evidenced by only a few of the teachers and their pupils. The types of questions asked by teachers and pupils was highly correlated (r_s=.90).

Questions of junior high and senior high student teachers were further analyzed by categorizing, for each item, individuals whose item mean fell above and below the group median for that item. On only three items were there obtained significant differences: "transformation" ($x^2 = 5.47$, $p<.05$); "evaluation" ($x^2 = 18.05$, $p<.001$), and "procedure" ($x^2 = 4.05$, $p<.05$). These results indicates that a larger proportion of junior high student teachers asked more questions in these categories than did senior high student teachers.

The number and precents of the student teachers and their classes which asked no questions in the question categories are presented in Table II.

Table II

Number and Parents of Social Studies Student Teachers and Their Classes (N=44) Asking No Questions in Question Categories

Question Category	TEACHER						PUPIL					
	All (N=44)		Sr.Hi.(N=32)		Jr.Hi.(N=12)		All(N=44)		Sr.Hi.(N=32)		Jr.Hi.(N=12)	
	N	%	N	%	N	%	N	%	N	%	N	%
Memory	0	0	0	0	0	0	20	45	17	53	3	25
Translation	18	41[1]	14	44	4	33	29	66	24	75	5	42
Interpretation	1	2	0	0	1	8	19	43	17	53	2	17
Application	34	77	24	75	10	83	44	100	32	100	12	100
Analysis	28	64	22	69	6	50	41	93	31	97	10	83
Synthesis	42	95	31	97	11	92	42	95	30	94	12	100
Evaluation	17	39	15	47	2	17	37	84	32	100	5	42
Affectivity	29	66	25	78	4	33	42	95	32	100	10	83
Procedure	7	16	5	16	2	17	28	64	25	78	3	25

[1]Rounded to nearest percent.

Not one of the student teachers failed to ask a "memory" question; all but one asked an "interpretation" question; and less than one-sixth did not ask a "procedure" question. Over one-half of the student teachers in both groups asked no questions categorized as "application," "analysis," and "synthesis," and, for the senior high group alone, "affectivity." Pupils in most classes observed failed to ask other than "memory," "procedure," and "translation" questions. Pupils in no class asked an "application" question and pupils in most classes did not ask questions of the teacher requiring "translation," "analysis," "synthesis," "evaluation," "affectivity," or even "procedure." The types of questions not asked by teachers and by pupils were closely related (junior high: $r_s = .93$; senior high: $r_s = .76$).

Discussion

Memory or the acquisition of knowledge was the major cognitive objective apparent in teachers' and pupils' verbal questions in these social studies classes. Indeed, when the "transformation" and "interpretation" categories are combined into "comprehension" (Bloom, 1956), no other cognitive objective seems to have been effectively operational in these 44 social studies classrooms. As a result, the intellectual atmosphere of these social studies classes can only be characterized as meager.

These findings are remarkably similar to those reported by Gallagher (1965). He noted that "cognitive-memory" was the most dominant thought process for both teachers and pupils in social studies. Also, an overwhelming emphasis upon acquisition of knowledge and a neglect of other cognitive objectives has been reported in an analysis of ninth-grade social studies examinations (Pfeiffer and Davis, 1965).

The accumulating evidence indicates persuasively that the major objectives guiding secondary school social studies classes are those emphasizing "memory" and "comprehension." Since Bloom (1965) described "comprehension" as the lowest form of intellectual activity, the operational objectives cannot be considered any but having a low cognitive level. This conclusion is particularly depressing in light of the generally held objective for the social studies to foster critical thinking, certainly involving high-level cognitive operations. Too, that student teachers evidenced behaviors typical of the field is surely cause for concern. At least two major observations seem viable.

One, more deliberate attention to different cognitive objectives in social studies' classrooms is necessary. To be sure, questions requiring memory will be essential, for knowledge is prerequisite to thinking. If other and higher level cognitive objectives are considered desirable, the types of questions employed in the classroom must be altered. Not only, but certainly, must social studies' teachers change the use of their own language (questions), but also must the type of questions be changed in classroom tests and in instructional materials (Davis and Hunkins, 1966). These suggestions are patently practical for Hunkins (1966) demonstrated that by changing the cognitive emphasis of questions in instructional materials to higher levels, pupil achievement was increased.

Two, specific understandings and skills of classroom questioning and the purposes of questions need major attention in the pre-service and in-service education of teachers. Apparently, any consideration, if any, of these important learnings by teacher candidates, at least those in this study, was not realistic and specific enough for them to be incorporated as behaviors. If social studies objectives are to emphasize higher thinking processes in practice, such a condition cannot be tolerated. Use of micro-teaching techniques (Allen,), a study program based on classroom-tested materials (e.g., Sanders, 1966), and feed-back and discussion of information obtained with the TPQI are reasonable possibilities. As a beginning, certainly, courses in social studies methods and student teaching could incorporate a component dealing specifically with questions, their cognitive emphases, and candidates' ability to vary their use of questions in classroom discourse.

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